Islamic Republic of Afghanistan

Ministry of Agriculture, Irrigation and Livestock

Agricultural Research Institute of Afghanistan

National Catalogue of Wheat Varieties in the Islamic Republic of Afghanistan

Prepared by:

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Acknowledgements

This publication, variety catalogue for 9 newly release wheat varieties resulted from collaborative work by Agricultural Research Institute of Afghanistan (ARIA) and Afghanistan Agricultural Input Project (AAIP) funded by World Bank.

Currently the Agriculture Research Institute of Afghanistan (ARIA) is the only national Institute which is responsible for the development of new wheat varieties. To develop the catalogue, it was necessary to establish DUS trials at multiple locations for two seasons during 2015 and 2016. The contribution by national experts from MAIL and AAIP in Mazar-e-Sharif, Herat and Kabul Agricultural Research Centers were crucial in the preparation of this catalogue. It is worth to appreciate from International Research Organizations (CIMMYT & ICARDA) for provision of pure seed of the varieties included in the DUS trails and their support during conduction of the DUS test.

Introduction

Variety development, creating new crop varieties, is a major investment for both public and private sector plant breeding programs. However, new crop varieties should be released, commercialized and adopted by farmers to realize returns on investments and impacts on food, Feed, fiber and bio-fuel security. In many developed seed programs, these varieties are made available to farmers through an efficient, effective and transparent release system conducted by an independent or impartial public agency or the industry. The agency conducts variety registration (DUS) and/or performance (VCU) testing. Registration testing is a descriptive assessment to establish the identity of the new variety using morphological, chemical, etc. characters, as well as its sufficient uniformity and stability. It usually runs for two independent growing seasons or years, where the new variety is compared with a wide range of existing varieties to establish its identity. Performance (VCU) testing focuses on the merit of the new variety to the end users, i.e. producers and consumers through multi-location and multi-year variety trials conducted in different agro- ecological zones to identify better performing varieties, which could meet diverse agronomic or consumer requirements or socio-economic conditions.

Plant variety

Plant variety is a population of plants developed by breeders. For a plant population to be recognized as a variety, it must satisfy at least four criteria. It must have distinctness, uniformity, genetic stability and novelty. Distinctness refers to significant differences between varieties in at least one important character recorded in one testing site for one season, whereas uniformity refers to similarity in the genetic makeup of individual plants belonging to a particular plant population (variety). If a plant population maintains its specific characteristics in successive generations, it is considered stable. Lack of uniformity within a population indicates lack of stability.

Importance of DUS testing

New crop varieties need to have a clear identity on which they can be maintained, multiplied, certified, popularized and used for commercial purposes. Variety identification is essential for variety maintenance (purification), seed production (rogueing), seed certification (field inspection), breeder's rights(protection) and above all commercialization (promotion) for food, feed and industrial purposes. DUS testing is the method by which the identity of new varieties are described and defined and national plant variety catalogue is prepared, maintained and updated regularly.

National plant variety catalogue

National variety catalogue is an official document in which all commercialized crop varieties in a given country are registered; and their major varietal characteristics, merits and technological advantages are listed. It is a useful and a valuable reference document for public and private plant breeders, seed producers and crop producers as well as seed certification agencies, extension services and plant variety protection offices.

DUS testing procedures

DUS plots are planted with the varieties grouped according to crops, seasonal types, plant height, maturity, etc. The methods, time of observations and scoring of characters are either according to the guidelines of the International Union for Protection of New Varieties of Plant (UPOV) or International Plant Genetic Resources Institute (IPGRI). The number of plants for visually-observed and measured characters was 30, which is greater than 20 individual plants as specified in the UPOV Guidelines. The data reported is for two years from three test sites and two replicates. All nine wheat varieties were bread wheat which was included in the trial. Out of 9 bread varieties, 5 are facultative, 2 are spring, and 2 are winter type.

Data type and quality

For the qualitative characteristics, the observations on the level of expression in different varieties tested were compared and then classified on a 1-9 scale. There were some differences in the observations recorded for the same characters in different sites probably due to human error or genotype by environment (GXE) interaction. For qualitative characteristics, GXE affects the extent to which a character is expressed but does not change the character. For example, a wheat variety with a reddish seed color maybe affected by environmental conditions and become darker or lighter but never white. The descriptions given for different characters of the varieties represent the most frequent scores over the three testing sites. For example if a character of a variety is scored as 5, 5, and 7 in the three testing sites, the final description given is medium (5). The scores made on a scale of 3, 5 and 7 for most characteristics recorded on all varieties included in the catalogue over two years and at three testing sites (Mazar-e-Sharif, Kabul and Herat) are presented in Table 3. Quick reference tables based on prominent characteristics namely plant height, beak length, straw color, earliness, grain weight, grain color and seasonal type are presented in Tables 5, 6, 7 and 8.

Table. Scoring and Use of Characters in Description

Characters	Scoring time	Scoring scale
Grow habit	from 5-tillers	Erect, intermediate and prostrate
Earliness	1rst spikelet visible	Early, medium and late
Auricle Color	Flowering	Present and absent
Flag leaf attitude	Flowering	Erect, semi-dropping and dropping
Flag leaf sheet glaucosity	Flowering	Weak, medium and strong
Flag leaf width (cm)	Flowering	Narrow, medium and broad
Last node hairiness	Flowering	Weak, medium and strong
Susceptibility to yellow rust	Flowering	Susceptible, tolerant and resistant
Glum hairiness	Physiological maturity	Present and absent
Cross section of neck	Physiological maturity	Thin, medium and thick
Plant height (cm)	Physiological maturity	Short, medium and tall
Beak Length	Physiological maturity	Very short, short, medium and long
Shoulder width	Physiological maturity	Narrow, medium and broad
Shoulder shape	Physiological maturity	Slopping, rounded, elevated and straight
Neck Zigzagness	Physiological maturity	Weak, medium and strong
Ear Shape	Physiological maturity	Tapering, fusiform and parallel
Ear density	Physiological maturity	Lax, medium and dense
Straw color	Full maturity	White and colored
Thousand kernel weight (g)	Full maturity	Low, medium and high
Grain color	Full maturity	White, amber white and red
Yield potential in kg/ha	Full maturity	Kilogram per hectare

2. Explanation of characters

Grain color: The natural color of matured wheat grains differs from light (white), slightly reddish (Amber) or dark red (Red) (Fig 1).

Thousand kernel weight (g): The weight of 1000 wheat kernels varies between varieties from low (20-30g), medium (30-40g) and high (>40) (see the figure above).

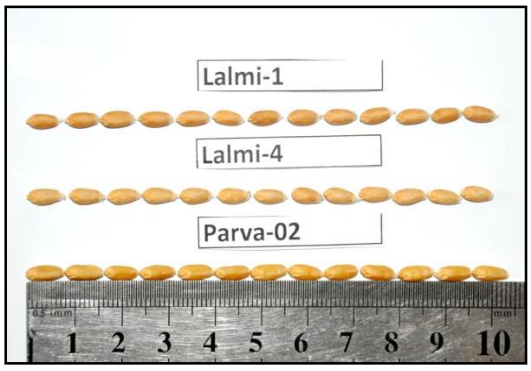


Figure1. Grain color and size

Growth habit: This refers to the angle between the auxiliary tillers of a plant and it's actual or imaginary up right main stem. It is best scored forbothwheatandbarleywhentheareabout5 tillers as erect, semi-erect, intermediate, and semi-prostrate or prostrates (Fig 2).

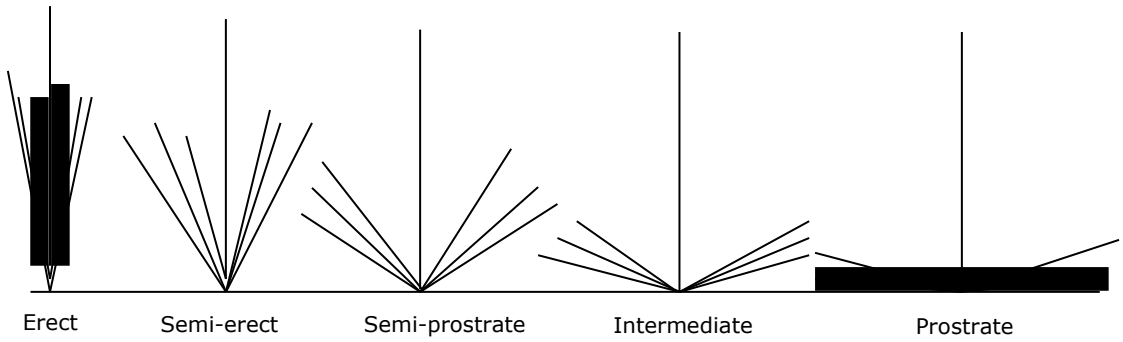


Figure 2. Growth habit

Earliness: The period between germination and heading varies significantly between wheat varieties from short, medium and late (Fig 3).

Auricle Color: The natural color of flag leaf auricles in wheat can be white or pink in color (Fig 4).

Flag leaf attitude: The angle between the flag leaf and the stem when the first spikelet is visible varies between varieties; it is either erect, semi-dropping or dropping (see below).

Figure 3. Earliness and other varietal differences

Flag leaf width (cm): The width of the flag leaf sheet of wheat varieties varies at the base in dimension and is narrow, medium or broad.

Glumes: Each individual spikelet of a spike is enclosed by two structures known as glumes. Wheat varieties can be grouped after anthesis, based on characteristics of different parts of the glumes including the beak, the shoulder and the internal imprints. For standardization purposes, all observations are made on the lower glume which can be identified by its lower point of attachment to the rachis branch than the upper glume.

Figure 4. Auricle color

Beak length of glume: The glume beak of wheat varies in length from very short to very long. This can be used to classify varieties between the time of anthesis and full maturity (Fig 5).

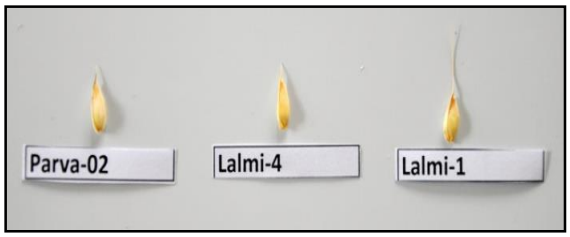


Figure 5. Beak length of glume

Shoulder width of glume: The glume shoulder of wheat varies in width from very narrow to very broad. This can be used to classify varieties between the time of anthesis and full maturity (see above).

Shoulder shape of glume: The shape of glume shoulder of wheat may be straight, rounded, sloping or elevated. Varieties can be classified on this character between anthesis and full maturity.

Straw color: The natural straw color of a mature wheat varieties varies from light or white (Fig 6).

Figure 6. Straw color

Ear shape: This refers to the general view of the ear and the position at which the broadest part of the ear is located. It is best scored from completion of heading to complete maturity as tapering.

Ear density: The spike of wheat is composed of several spikelets attached to the main rachis. The closer the distance between the spikelets, the more dense is the spike. It is best scored from completion of heading to complete maturity as very lax, lax, medium, dense or very dense.

Hairiness of last node: This refers to the presence of hairs on the uppermost node of wheat stems. Variety differences exist in both bread and durum wheat. It is best scored between heading and anthesis as strong, medium, weak, very weak or absent.

Glume hairiness: Based on glume pubescence, wheat varieties can be classified into glabrous or hairy.

Thickness of parenchyma wall: This refers to the thickness of the parenchyma wall in a horizontal section made at the middle of the spike neck. Variety differences exist in both bread and durum wheat. It is best scored from heading to complete maturity as thick, medium or thin (Fig 7).

Plant height (cm): Based on the significant differences in plant height at full maturity, wheat varieties may be classified as short, medium or high.

Neck Zigzagness: Wheat varieties can be classified based on neck Zigzagness as weak, medium and strong.

Figure 7. Thickness of parenchyma wall

Characterization

Of

Wheat Varieties

Lalmi-4

Crop:	Wheat
Common name:	Bread wheat
Scientific name:	*Triticum aestivum* L.
Pedigree:	SLVS*2/PASTOR
Seasonal type:	Facultative
Origin:	CIMMYT
Other Names:	-

Morphological characterization

Grain characteristics

Grain color	Amber
Thousand kernel weight (g)	43 g

Juvenile plant characteristics

Growth habit	Simi-erect

Flowering plant characteristics

Days from emergence to flowering	Medium
Auricle color	Absent
Flag leaf attitude	Slightly curved
Flag leaf sheet glaucosity	Weak
Flag leaf width (cm)	Narrow
Glume hairiness	Absent
Cross Section of neck	Thin

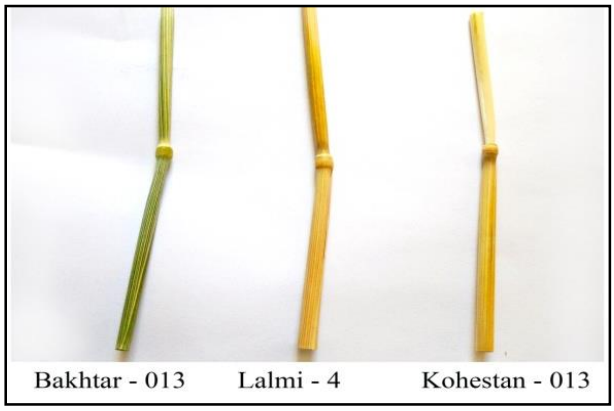
Merits

Disease reaction	Resistant to yellow rust
Yield potential	4.2 MT/ha

Mature plant characteristics

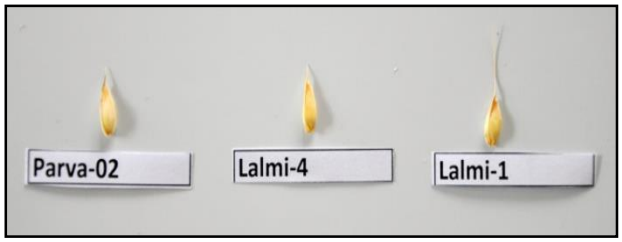
Last node hairiness	Medium
Plant height (cm)	Medium
Beak length of lower glume	Short
Shoulder width of lower glume	Medium
Shoulder shape of lower glume	Sloping
Neck zigzagness	Weak
Ear shape	Parallel
Ear density	Medium
Ear color	White

Earliness

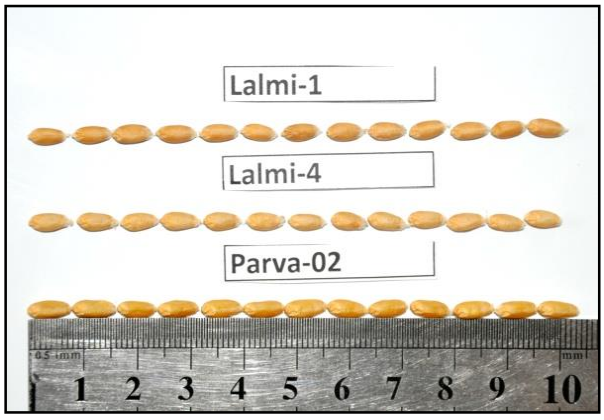


Spikes

Lower glumes



Grain Sample



Baghlan-09

Crop:	Wheat
Common name:	Bread wheat
Scientific name:	*Triticum aestivum* L.
Pedigree:	PICAFLOR#1KIRITAI/ SERI/RAYON
Seasonal type:	Spring
Origin:	CIMMYT Other
Names:	-

Morphological characterization

Grain characteristics

Grain color	Amber
Thousand kernel weight (g)	45

Juvenile plant characteristics

Growth habit	Erect

Flowering plant characteristics

Days from emergence to flowering	Early
Auricle color	Very weak
Flag leaf attitude	Slightly curved
Flag leaf sheet glaucosity	Weak
Flag leaf width (cm)	Medium
Glume hairiness	Present
Cross section of neck	Thin

Merits

Disease reaction	Resistant to yellow rust
Potential Yield potential	4.7 Mt/ha

Maturing plant characteristics

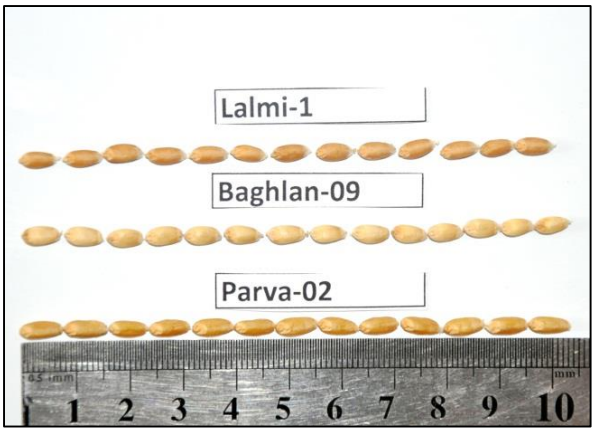
Last node hairiness	Very weak
Plant height (cm)	Medium
Beak length	Medium
Shoulder width	Medium
Shoulder shape	Straight
Neck zigzagness	Very weak
Ear Shape	Parallel
Ear density (spikelets/cm of rachis)	Medium
Straw color	White

Earliness

Spikes

Lower glumes

Grain Sample



Dehdadi-013

Crop:	Wheat
Common name:	Bread wheat
Scientific name:	*Triticum aestivum* L.
Pedigree:	PYN/BAU//MILAN
Seasonal type:	Facultative
Origin:	ICARDA
Other Names:	-

Morphological characterization

Grain characteristics

Grain color	Amber
Thousand kernel weight (g)	40

Juvenile plant characteristics

Growth habit	Semi-Prostrate

Flowering plant characteristics

Days from emergence to flowering	Medium
Auricle color	Very weak
Flag leaf attitude	Slightly
Flag leaf sheet glaucosity	Medium
Flag leaf width (cm)	Narrow
Glume hairiness	Present
Cross section of neck	Thin

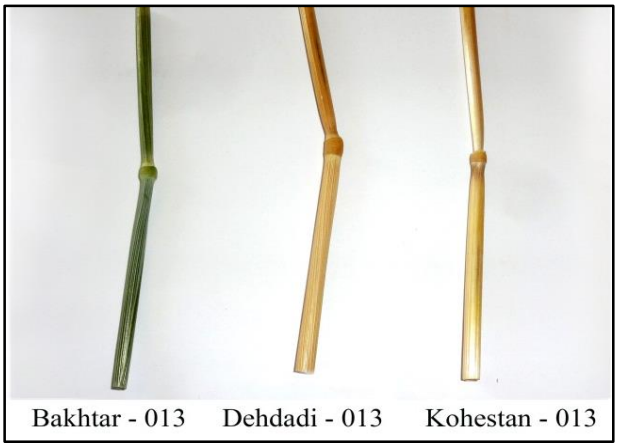
Merits

Disease reaction	Resistant to yellow rust
Yield potential	4.3 Mt/ha

Maturing plant characteristics

Last node hairiness	Very weak
Plant height (cm)	Medium
Beak length	Short
Shoulder width	Short
Shoulder shape	Straight
Neck zigzagness	Very weak
Ear shape	Tapering
Ear density (spikelets/cm of rachis)	Dense
Straw color	White

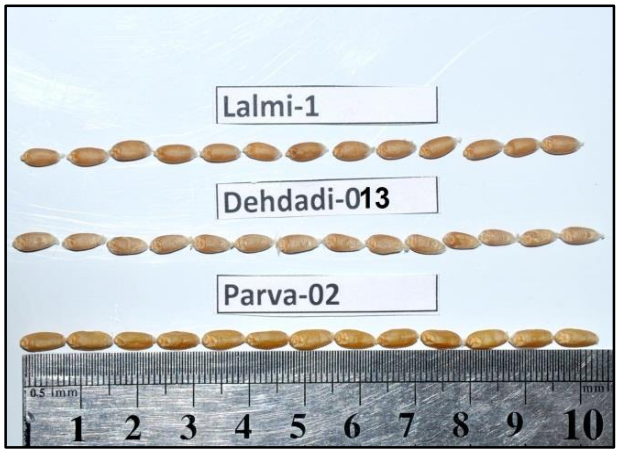
Earliness



Spikes

Lower glume

Grain sample



Moqwaim-09

Crop:	Wheat
Common name:	Bread wheat
Scientific name:	*Triticum aestivum* L.
Pedigree:	OASSIS/SKAUZ// 4*VCN/3/2*PASTOR
Seasonal type:	Facultative
Origin:	CIMMYT
Other Names:	-

Morphological characterization

Grain characteristics

Grain color	Amber
Thousand kernel weight (g)	43

Juvenile plant characteristics

Growth habit	Intermediate

Flowering plant characteristics

Days from emergence to flowering	Early
Auricle color	Very weak
Flag leaf attitude	Rectilinear
Flag leaf sheet glaucosity	Very Weak
Flag leaf width (cm)	Medium
Glume hairiness	Present
Cross section of neck	Thin

Merits

Disease reaction	Susceptible to yellow rust
Yield potential	4.9 Mt/ha

Maturing plant characteristics

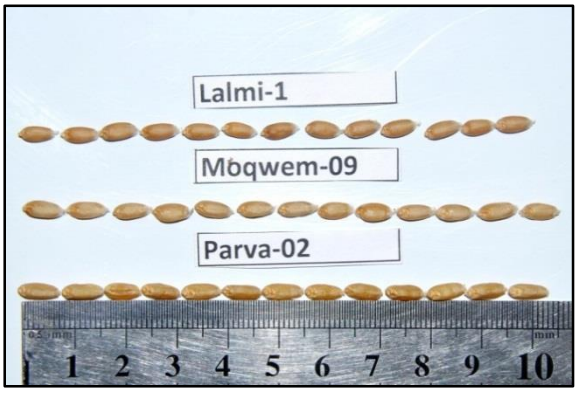
Last node hairiness	Weak
Plant height (cm)	Short
Beak length	Very Short
Shoulder width	Medium
Shoulder shape	Slightly Slopping
Neck zigzagness	Medium
Ear shape	Parallel
Ear density (spikelets/cm of rachis)	Lax
Straw color	White

Earliness

Spikes

Lower glume

Grain Sample



Bakhtar-013

Crop:	Wheat
Common name:	Bread wheat
Scientific name:	*Triticum aestivum* L.
Pedigree:	ISENGRAIN X ORNICAR
Seasonal type:	Winter
Origin:	French .CO
Other Names:	-

Morphological characterization

Grain characteristics

Grain color	Amber
Thousand kernel weight (g)	38

Juvenile plant characteristics

Growth habit	Simi-erect

Flowering plant characteristics

Days from emergence to flowering	Late
Auricle color	Weak
Flag leaf attitude	Slightly Curved
Flag leaf sheet glaucosity	Weak
Flag leaf width (cm)	Broad
Glume hairiness	Present
Cross section of neck	Thin

Merits

Disease reaction	Resistant to yellow rust
Yield potential	4.7 Mt/ha

Maturing plant characteristics

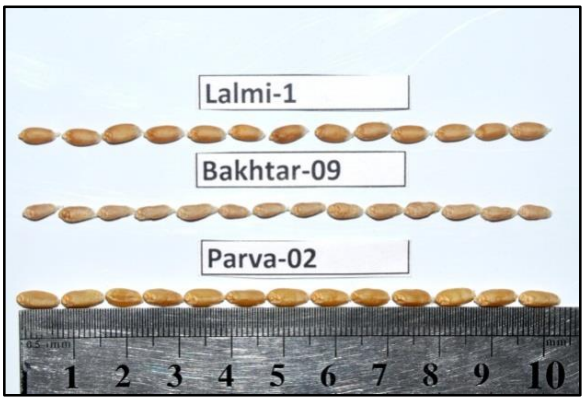
Last node hairiness	Weak
Plant height (cm)	Short
Beak length	Short
Shoulder width	Medium
Shoulder shape	Slightly sloping
Neck zigzagness	Weak
Ear shape	Parallel
Ear density (spikelets/cm of rachis)	Medium
Straw color	White

Earliness

Spikes

Grain Sample

Lower glume



Chont #1

Crop:	Wheat
Common name:	Bread wheat
Scientific name:	*Triticum aestivum* L.
Pedigree:	CERI.1B*2/3 KAUZ*2/BOW//KAUZ/4/PBW43*2/KUKUNA
Seasonal type:	Facultative
Origin:	CIMMYT
Other Names:	-

Morphological characterization

Grain characteristics

Grain color	Amber
Thousand kernel weight (g)	42

Juvenile plant characteristics

Growth habit	Intermediate

Flowering plant characteristics

Days from emergence to flowering	Medium
Auricle color	Very weak
Flag leaf attitude	Slightly curved
Flag leaf sheet glaucosity	weak
Flag leaf width (cm)	Medium
Glume hairiness	Absent
Cross section of neck	Medium

Merits

Disease reaction	Resistant to yellow rust
Yield potential	5.3 Mt/ha

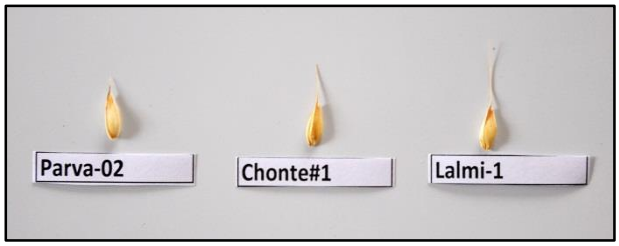
Maturing plant characteristics

Last node hairiness	Weak
Plant height (cm)	Medium
Beak Length	Long
Shoulder width	Medium
Shoulder shape	Elevated
Neck zigzag	Medium
Ear shape	Tapering
Ear density (spikelets/cm of rachis)	Medium
Straw color	White

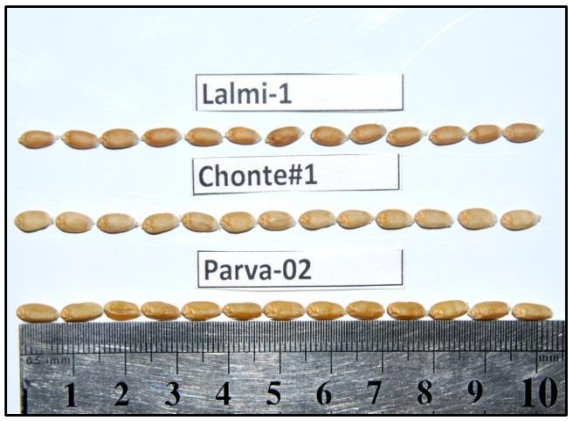
Earliness

Spikes

Lower glume



Grain Sample



Amir-2010

Crop:	Wheat
Common name:	Bread wheat
Scientific name:	*Triticum aestivum* L.
Pedigree:	SHAM6/WW1402
Seasonal type:	Facultative
Origin:	ICARDA
Other Names:	-

Morphological characterization

Grain characteristics

Grain color	Amber
Thousand kernel weight (g)	40

Juvenile plant characteristics

Growth habit	Semi-erect

Flowering plant characteristics

Days from emergence to flowering	Medium
Auricle color	Very weak
Flag leaf attitude	Slightly curved
Flag leaf glaucosity	Very weak
Flag leaf width (cm)	Broad
Glume hairiness	Present
Cross section of neck	Thick

Merits

Disease reaction	Resistance to yellow rust
Yield potential	4.5 Mt/ha

Maturing plant characteristics

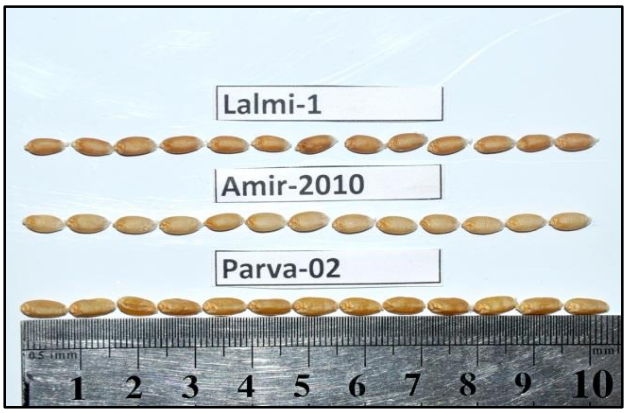
Last node hairiness	Weak
Plant height (cm)	Short
Beak length	Short
Shoulder width	Narrow
Shoulder shape	Sloping
Neck zigzagness	Very weak
Ear shape	Parallel
Ear density (spikelets/cm of rachis)	Medium
Straw color	White

Earliness

Spikes

Lower glume

Grain Sample



Melad-013

Crop:	Wheat
Common name:	Bread wheat
Scientific name:	*Triticum aestivum* L.
Pedigree:	(ORPICXISENGRAIN)
Seasonal type:	Winter
Origin:	French, Co
Other Names:	-

Morphological characterization

Grain characteristics

Grain color	Red
Thousand kernel weight (g)	38

Juvenile plant characteristics

Grow habit	Prostrate

Flowering plant characteristics

Days from emergence to flowering	Late
Auricle color	Weak
Flag leaf attitude	Re curved
Flag leaf sheet glaucosity	Weak
Flag leaf width (cm)	Medium
Glume hairiness	Absent
Cross section of neck	Thick

Merits

Disease reaction	Resistance to yellow rust
Yield potential	4.9 Mt/ha

Maturing plant characteristics

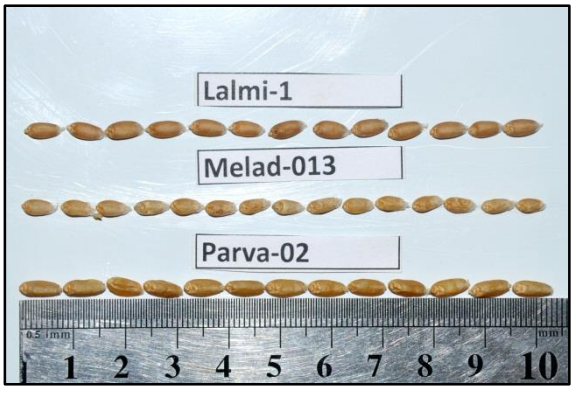
Last node hairiness	Weak
Plant height (cm)	Medium
Beak length	Short
Shoulder width	Medium
Shoulder shape	Straight sloping
Neck zigzagness	Weak
Ear Shape	Parallel
Ear density (spikelets/cm of rachis)	Dense
Straw color	White

Earliness

Spikes

Grain Sample

Grain Sample



Kabul-013

Crop:	Wheat
Common name:	Bread wheat
Scientific name:	*Triticum aestivum* L.
Pedigree:	WAXWIND*2/TUKURU
Seasonal type:	Spring
Origin:	CMMYT
Other Names:	-

Morphological characterization

Grain characteristics

Grain color	Amber
Thousand kernel weight	43

Juvenile plant characteristics

Grow habit	Erect

Flowering plant characteristics

Days from emergence to flowering	Medium
Auricle color	Very weak
Flag leaf attitude	Slightly curved
Flag leaf sheet glaucosity	Weak
Flag leaf width (cm)	Medium
Glume hairiness	Absent
Cross section of neck	Thick

Merits

Disease reaction	Resistant to yellow rust
Yield potential	5.3 Mt/ha

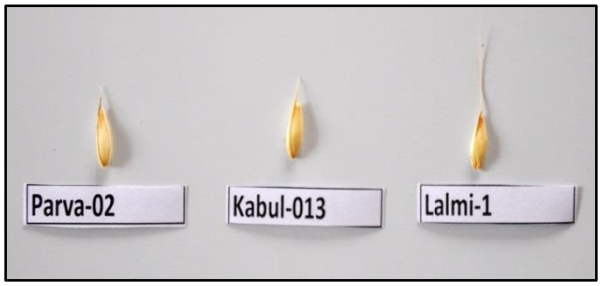
Maturing plant characteristics

Last node hairiness	Weak
Plant height	Medium
Beak length	Short
Shoulder width	Medium
Shoulder shape	Slightly sloping
Neck Zigzagness	Very weak
Ear shape	Parallel
Ear density (spikelets/cm of rachis)	Medium
Straw color	White

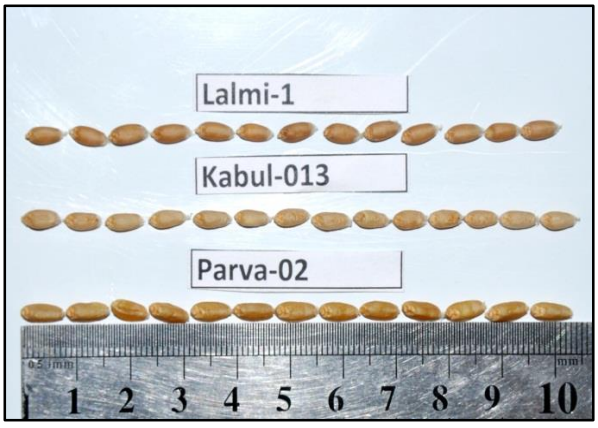
Earliness

Spikes

Grain Sample



Grain Sample



Additional Data

Table 2. Pedigree and sources of nine bread wheat varieties

S.N	Varieties	Type	Source	Pedigree
1	LALMI-4	Spring	CIMMYT	SLVS*2/PASTOR
2	BAGHLAN-09	Facultative	CIMMYT	PICAFLOR#1 KIRITAI/SERI/RAYON
3	DEHDADI-013	Facultative	ICARDA	PYN/BAU//MILAN
4	MOQAWEM-09	Facultative	CIMMYT	OASSIS/SKAUZ//4*BCN/3/2*PASTOR
5	BAKHTAR-013	Winter	FRENCH	ISENGRAIN X ORNICAR
6	CHONTE#1	Facultative	CIMMYT	SERI.1B*2/3KAUZ*2/BOW//KAUZ/4/PBW343*2/KUKUNA
7	AMIR-2010	Facultative	ICARDA	CHAM-6/WW1402
8	MELAD-013	Winter	FRENCH	(OrpicX Isengrain) X
9	KABUL-013	spring	CIMMYT	WAXWIND*2/TUKURU

Table 3: Summary of qualitative and quantitative data scored in two consecutive seasons at Kabul, Mazar, Nangarhar and Herat. (Converted into 1 – 9 scales)

Varieties	Characteristic Number-1																									
	Anthocyanin coloration of coleoptile	Growth habit	Lower glume beak length	Lower glume shoulder width	Lower glume shoulder shape	Flag leaf attitude	Time of ear emergence	Flag leaf, glaucosity of leaf blade	Straw section	Hairiness of upper node	Neck Zigzagness	Glume hairiness	Culm Glaucosity of neck	Anthers Anthocyanin coloration	Ear shape	Anthocyanin coloration of auricles	Ear density	Flag leaf width	Straw color	Apical rachis segment	Grain color	Seasonal type	Glume internal imprint	Grain shape	Brush hair length	Days to flowering
Lalmi-4	1	3	3	5	1	3	5	3	5	5	3	1	5	1	2	1	5	1.4	1	3	1	3	5	2	3	5
Baghlan-09	3	1	5	5	5	3	3	3	3	1	1	2	5	1	2	1	5	1.4	1	5	1	2	7	2	7	3
Dehdadi-013	1	7	3	5	5	3	5	3	3	1	1	2	5	1	1	1	7	1.3	1	5	1	2	5	3	7	5
Moqawim-09	1	5	1	5	3	1	3	1	3	3	3	2	3	1	2	1	3	1.4	1	5	1	2	3	2	7	3
Bakhtar-013	1	7	3	5	3	3	7	3	5	3	3	2	5	1	2	3	5	1.5	1	3	2	1	7	2	7	7
Chonte-1	5	5	7	5	7	3	5	3	3	3	3	1	5	1	1	1	5	1.4	1	5	1	2	5	2	5	5
Amir-013	1	3	3	3	1	3	5	1	5	3	1	2	1	1	2	1	5	1.5	1	7	1	2	3	2	5	5
Melad-013	3	9	3	5	3	5	9	3	3	3	3	1	5	1	2	3	7	1.4	1	7	1	1	7	2	5	7
Kabul-013	5	1	3	5	3	3	5	3	5	3	1	1	3	1	2	1	5	1.4	1	3	1	3	3	2	5	5

Table 4: Quick reference for spring wheat varieties

5	4	1 Sloping			Slightly sloping		Straight
		2 Absent	medium	weak	Weak	Absent	Strong
		3 very weak	weak	Strong	V, Weak	weak	Strong
medium	Short				Kabul-13		
Long	Medium						
Short	Short		Llalmi-4				

Shoulder shape (1), Hairiness of upper node (2), Neck Zigzagness (3), beak length (4) and Brush hair length (5)

Table 5: Quick reference for winter wheat varieties of Afghanistan

5	4	3	1 Amber	Red	White
			2 Thin	Medium	Thick
Short	Lax	Erect			
	Medium	Semi erect			
	Dense	Semi prostrate			
		Prostrate			
Medium	Lax	Erect			
	Dense	Prostrate	Melad-013		
	Medium	Semi prostrate		Bakhtr-013	
Tall	Lax	Erect			
	Medium	Semi erect			
	Dense	Semi prostrate			

Grain color (1), Straw section (2), Growth habit (3), Ear density (4) Plant height (5)

Table 6. Quick reference table for facultative and alternative wheat varieties of Afghanistan

1 / 2 / 3 / 5 / 4		Erect			Semi-erect			Semi prostrate		
		Sloping	Straight	Elevated	Sloping	S Sloping	Elevated	Sloping	Elevated	Straight
		Lax	Medium	Dense	Medium	Lax	Medium	Lax	Medium	Dense
Very short	Early					Moqawem-09				
	Medium									
	Late									
Short	Early									
	Medium				Amir-13					
	Late									Dehdadi-13
Medium	Early		Baghlan-09							
	Late									
Long	Early									
	Medium						Chonte#1			

Growth habit (1), shoulder shape (2), Ear density (3), Earliness (4), beak length (5),

Table 7. Quick reference table for wheat varieties released of Afghanistan

6	5	4	1	S-Sloping				Straight			Elevated		
			2	Weak	weak	Weak	V. weak	Very weak	Weak	Very weak	Very weak	Weak	Medium
			3	Medium	Lax	Dense	Medium	Medium	Lax	Dense	Lax	Medium	Dense
Short	Erect	Early											
	semi-erect	Medium					Amir-13						
	semi prostrate	Late											
	prostrate	Late											
Medium	Prostrate	Late				Melad-13							
	semi prostrate	Late	Bakhter-13							Dehdadi-13			
	semi- erect	Early		Moqawem-09									
	semi- erect	Medium										Chonte#1	
	Erect	Medium					Kabul-13						
	Erect	Early						Baghlan-09					
	semi-erect	Late	Lalmi-4										

shoulder shape (1), Neck Zigzagness (2), Ear density (3) , Earliness (4),Growth habit (5), Plant height (6),